

## CLAIMS

1. Hepatitis A virus recombinant antigens wherein they are obtained in vegetable cells transformed with genetic constructs which contain chimeric HAV genes based on modified fragments of the HAV genome (SEQ ID NO 3).
2. Hepatitis A virus recombinant antigens according to the claim 1 characterized by they contain only pentamers.
3. Hepatitis A virus recombinant antigens according to the claims 1 and 2 characterized by they are obtained from the expression of a chimeric gene according to SEQ ID NO 17 that contains the fusion of the following elements:
  - a. A nucleotide sequence that codes for the proteins VP2, VP3, VP1 and 2A (SEQ ID NO 25)
  - b. A nucleotide sequence that codes for the proteins 3A, 3B, 3C. (SEQ ID NO 13)
4. Hepatitis A virus recombinant antigens according to the claim 3 wherein the chimeric gene is expressed in vegetable cells regulated by the appropriate promoter and terminator signals.
5. Hepatitis A virus recombinant antigens according to the claim 4 characterized by they are obtained in the cytoplasm of the vegetable cell.
6. Hepatitis A virus recombinant antigens according to the claim 5 characterized by they are expressed in dicotyledonous plants.
7. Hepatitis A virus recombinant antigens according to the claim 6 characterized by they are expressed in tobacco, carrot and fruits of edible plants.
8. Hepatitis A virus recombinant antigens according to the claim 5 characterized by they are expressed in monocotyledonous plants.
9. Hepatitis A virus recombinant antigens according to the claim 8 characterized by they are expressed in rice and in fruits of edible plants.
10. Hepatitis A virus recombinant antigens according to the claim 1 characterized by they contain pentamers and empty capsids.
11. Hepatitis A virus recombinant antigens according to the claim 10 characterized by they were obtained from the expression of a chimeric gene that contains the fusion of the two following elements:
  - a. A nucleotide sequence according to the SEQ ID NO 6 coding for the proteins VP4, VP2, VP3, VP1 and 2A.

- b. A nucleotide sequence coding for the proteins 3A, 3B and 3C according to the claim 3b.
12. Hepatitis A virus recombinant antigens according to the claim 11 wherein the chimeric gene is expressed in the vegetable cell regulated by appropriate promoter and terminator signals.
13. Hepatitis A virus recombinant antigens according to the claim 12 characterized by they are obtained in the cytoplasm of the vegetable cell.
14. Hepatitis A virus recombinant antigens according to the claim 13 characterized by they are obtained in dicotyledonous plants.
15. Hepatitis A virus recombinant antigens according to the claim 14 characterized by they are expressed in tobacco, carrot and fruits of edible plants.
16. Hepatitis A virus recombinant antigens according to the claim 13 characterized by they are obtained in monocotyledonous plants.
17. Hepatitis A virus recombinant antigens according to the claim 16 characterized by they are expressed in rice and fruits of edible plants.
18. Hepatitis A virus recombinant antigens according to the claim 2 wherein they are obtained from the coordinated expression of the two chimeric genes:
  - a. A nucleotide sequence, according to the sequence ID No.24 coding for the proteins VP2, VP3, VP1, 2A, fused at its 5' end to a signal sequence and at its 3' end to an spacer sequence followed by the sequence coding for the KDEL peptide.
  - b. A nucleotide sequence according to the sequence ID No. 23 coding for the proteins 3A, 3B, 3C referred in the claim 3B, fused at its 5' end to a signal sequence and at its 3' end to an spacer sequence followed by the sequence coding for the KDEL peptide.
19. Hepatitis A virus recombinant antigens as in the claim 18 characterized by chimeric genes are expressed in the vegetable cell regulated by appropriate promoter and terminator signals.
20. Hepatitis A virus recombinant antigens as in the claims 18 and 19 wherein they are obtained in the endoplasmic reticulum of the vegetable cell.
21. Hepatitis A virus recombinant antigens as in the claim 20 characterized by they are obtained in dycot plants.
22. Hepatitis A virus recombinant antigens as in the claim 21 characterized by they are obtained in tobacco, carrot and fruits of edible plants.

23. Hepatitis A virus recombinant antigens as in the claim 20 characterized by they are obtained in monocot plants.
24. Hepatitis A virus recombinant antigens as in the claim 23 characterized by they are obtained in rice and fruits of edible plants.
- 5 25. Hepatitis A virus recombinant antigens as in the claim 10 wherein they are obtained from the coordinated expression of two chimeric genes.
- a. A nucleotide sequence according to the sequence ID No. 22 coding for the proteins VP4, VP2, VP3, VP1, 2A fused at its 5' end to a signal sequence and at its 3' end to an spacer sequence followed by the sequence coding for the
- 10 KDEL peptide.
- b. A nucleotide sequence according to the claim 18b.
26. Hepatitis A virus recombinant antigens as in the claim 25 characterized by chimeric genes are expressed in the vegetable cell regulated by appropriate promoter and terminator signals.
- 15 27. Hepatitis A virus recombinant antigens as in the claims 25 and 26 characterized by they are obtained in the endoplasmic reticulum of the vegetable cell.
28. Hepatitis A virus recombinant antigens as in the claim 27 characterized by they are obtained in dycot plants.
29. Hepatitis A virus recombinant antigens as in the claim 28 characterized by they are
- 20 obtained in tobacco, carrot and fruits of edible plants.
30. Hepatitis A virus recombinant antigens as in the claim 27 characterized by they are obtained in monocot plants.
31. Hepatitis A virus recombinant antigens as in the claim 30 characterized by they are obtained in rice and fruits of edible plants.
- 25 32. Hepatitis A virus recombinant antigens as in the claims 1, 3, 11, 18 and 25 which can be purified to be administered by parenteral way.
33. Hepatitis A virus recombinant antigens as in the claim 32 which can be administered in combination with other viral antigens.
34. Hepatitis A virus recombinant antigens as in the claims 1, 3, 11, 18 and 25 which can
- 30 be administered by oral way.
35. Hepatitis A virus recombinant antigens as in the claim 34 which can be administered as lyophilized extract, pill or capsule.

36. Hepatitis A virus recombinant antigens as in the claims 1, 3, 11, 18 and 25 which can be administered in juice form.
37. Hepatitis A virus recombinant antigens as in the claims 1, 3, 11, 18 and 25 which are immunogenic and rise protective immune response against Hepatitis A.
- 5 38. Hepatitis A virus recombinant antigens as in the claim 32 which can be used as part of a diagnostic kit for Hepatitis A.
39. The use of the antigens referred in the claims 1 to 38 to prepare simple and combined vaccines.